

Supplementary Table 1. Participant demographics in Experiment I.

Age	Gender	Race	Cig/day	Smoking status
47	Male	African American	12	Smoker
46	Male	White or other	40	Smoker
36	Male	African American	40	Smoker
42	Male	African American	10	Smoker
52	Male	African American	40	Smoker
49	Male	African American	10	Smoker
41	Male	White or other	40	Smoker
42	Male	African American	8	Smoker

Supplementary Table 2. Participant demographics in Experiment II.

Age	Gender	Race	Cig/day	Smoking status
39	Male	African American	20	Smoker
37	Male	African American	20	Smoker
46	Female	African American	20	Smoker
47	Male	African American	12	Smoker
46	Male	White or other	40	Smoker
51	Male	White or other	30	Smoker
36	Male	African American	40	Smoker
18	Male	White or other	30	Smoker
35	Male	White or other	30	Smoker
44	Male	White or other	15	Smoker
42	Female	African American	15	Smoker
28	Female	African American	10	Smoker
45	Male	White or other	20	Smoker
37	Male	White or other	30	Smoker
57	Male	African American	20	Smoker
34	Male	African American	30	Smoker
27	Male	White or other	20	Smoker
47	Female	African American	12	Smoker
46	Male	White or other	25	Smoker
45	Male	African American	10	Smoker
55	Female	White or other	20	Smoker
39	Male	African American	10	Smoker
43	Female	African American	5	Smoker
42	Male	African American	10	Smoker
24	Male	White or other	40	Smoker
36	Female	African American	10	Smoker
42	Female	White or other	30	Smoker
54	Female	White or other	20	Smoker
28	Female	White or other	15	Smoker
28	Female	White or other	18	Smoker
52	Male	African American	40	Smoker
40	Female	White or other	10	Smoker
42	Male	White or other	30	Smoker
39	Male	African American	30	Smoker
39	Male	White or other	20	Smoker
49	Male	African American	10	Smoker
51	Male	White or other	30	Smoker
45	Female	White or other	20	Smoker
37	Male	White or other	15	Smoker
55	Female	African American	20	Smoker

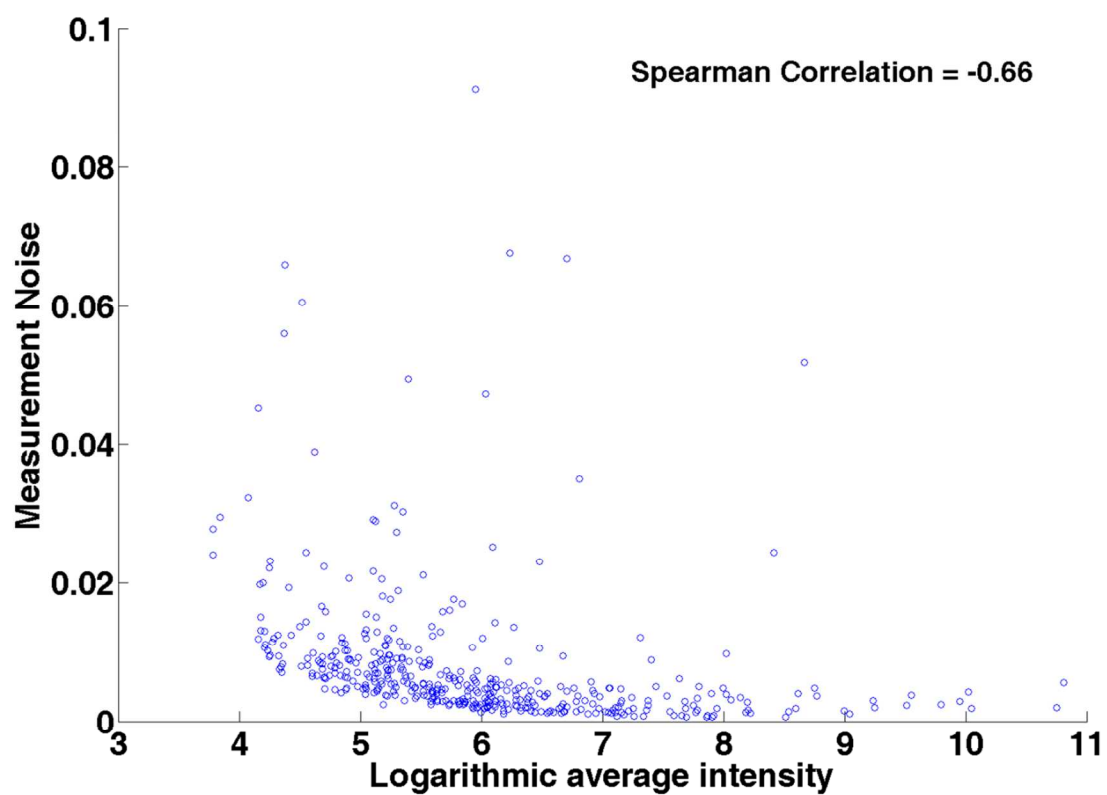
61	Female	White or other	10	Smoker
39	Male	African American	20	Smoker
41	Male	White or other	40	Smoker
41	Female	White or other	10	Smoker
41	Female	White or other	30	Smoker
53	Male	White or other	15	Smoker
35	Male	African American	12	Smoker
42	Female	White or other	20	Smoker
46	Female	White or other	10	Smoker
41	Male	White or other	30	Smoker
68	Female	White or other	20	Smoker
63	Male	White or other	20	Smoker
37	Male	African American	20	Smoker
29	Male	White or other	25	Smoker
38	Female	White or other	15	Smoker
58	Female	White or other	15	Smoker
40	Female	African American	16	Smoker
19	Male	White or other	15	Smoker
25	Male	White or other	20	Smoker
44	Female	African American	30	Smoker
33	Male	White or other	30	Smoker
25	Male	White or other	20	Smoker
33	Male	African American	15	Smoker
36	Female	White or other	20	Smoker
41	Male	White or other	20	Smoker
46	Male	African American	15	Smoker
33	Male	African American	6	Smoker
36	Male	African American	12	Smoker
43	Male	African American	20	Smoker
42	Male	African American	8	Smoker
45	Male	White or other	20	Smoker
42	Female	African American	15	Smoker
45	Female	African American	15	Smoker
47	Female	African American	10	Smoker
57	Female	African American	15	Smoker
39	Male	African American	15	Smoker
56	Female	African American	15	Smoker
42	Male	African American	12	Smoker
58	Male	White or other	8	Smoker
40	Male	African American	15	Smoker
43	Male	African American	10	Smoker
45	Male	African American	11	Smoker
43	Female	African American	20	Smoker

49	Male	White or other	15	Smoker
50	Male	African American	10	Smoker
44	Female	African American	10	Smoker
46	Male	African American	10	Smoker
34	Male	African American	20	Smoker
45	Female	African American	15	Smoker
43	Male	African American	10	Smoker
43	Male	African American	12	Smoker
46	Female	African American	15	Smoker
61	Male	African American	20	Smoker
52	Male	African American	5	Smoker
41	Male	African American	5	Smoker
31	Male	African American	15	Smoker
51	Female	African American	10	Smoker
48	Female	African American	4	Smoker
58	Female	African American	20	Smoker
69	Male	African American	20	Smoker
31	Male	African American	10	Smoker
23	Male	African American	5	Smoker
38	Male	African American	68	Smoker
48	Male	African American	6	Smoker
45	Female	African American	20	Smoker
46	Male	African American	10	Smoker
46	Female	African American	10	Smoker
45	Male	White or other	15	Smoker
34	Female	African American	10	Smoker
53	Male	White or other	40	Smoker
53	Male	African American	15	Smoker
32	Male	White or other	6	Smoker
49	Male	African American	20	Smoker
47	Female	African American	20	Smoker
51	Male	African American	20	Smoker
47	Male	African American	10	Smoker
55	Male	African American	20	Smoker
33	Female	African American	20	Smoker
41	Male	African American	20	Smoker
43	Male	White or other	20	Smoker
50	Female	African American	10	Smoker
49	Female	White or other	30	Smoker
54	Male	White or other	20	Smoker
49	Male	African American	10	Smoker
41	Female	African American	20	Smoker
31	Male	White or other	30	Smoker

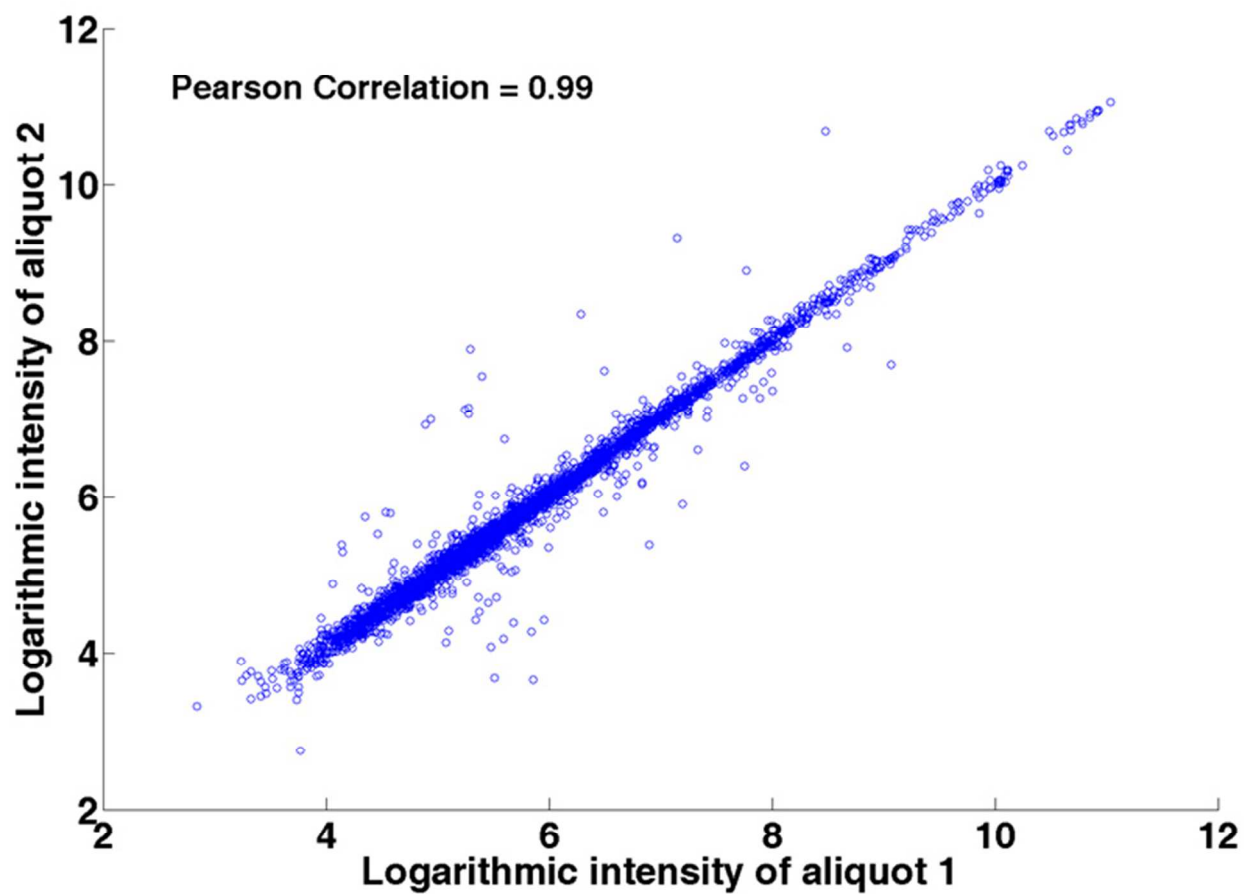
39	Male	African American	20	Smoker
34	Male	African American	10	Smoker
37	Male	African American	20	Smoker
36	Female	White or other	12	Smoker
46	Male	White or other	20	Smoker
51	Male	White or other	20	Smoker
42	Female	African American	20	Smoker
49	Male	White or other	20	Smoker
21	Male	African American	11	Smoker
46	Male	White or other	20	Smoker
44	Female	White or other	20	Smoker
45	Male	African American	10	Smoker
19	Male	White or other	20	Smoker
37	Female	White or other	20	Smoker
57	Male	African American	10	Smoker
56	Female	African American	15	Smoker
39	Female	White or other	20	Smoker
42	Male	African American	10	Smoker
33	Male	African American	15	Smoker
45	Female	White or other	10	Smoker
40	Female	African American	12	Smoker
54	Female	African American	40	Smoker
35	Female	African American	10	Smoker
34	Female	African American	5	Smoker
49	Male	White or other	20	Smoker
49	Male	African American	15	Smoker
45	Male	African American	20	Smoker
43	Male	White or other	20	Smoker
45	Female	African American	30	Smoker
41	Female	African American	10	Smoker
42	Female	White or other	18	Smoker
27	Male	White or other	30	Smoker
44	Male	African American	20	Smoker
60	Female	White or other	18	Smoker

Supplementary Table 3. Participant demographics in Experiment III.

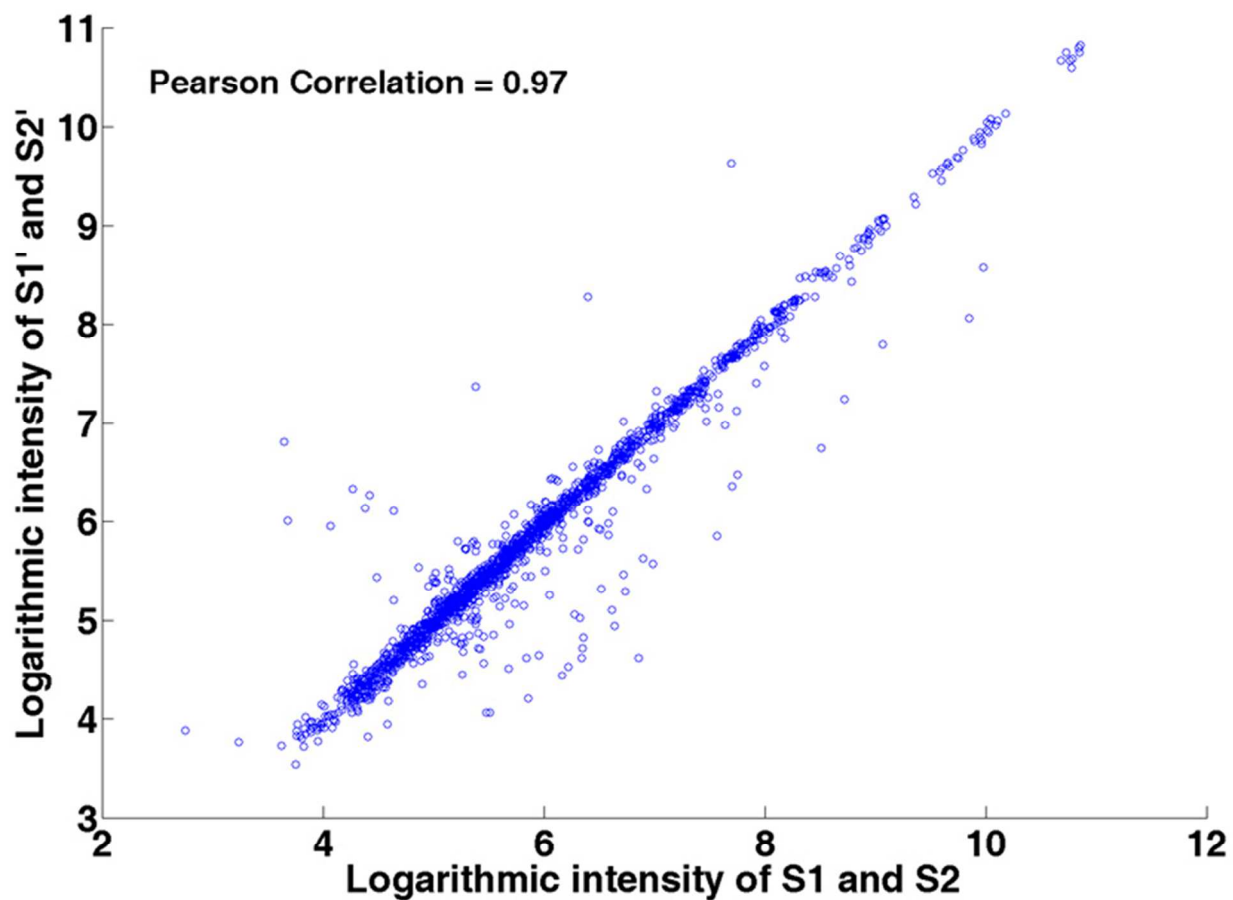
Age	Gender	Race	Cig/day	Smoking status
47	Female	Caucasian	13	Smoker
50	Male	African American	11	Smoker
46	Female	African American	10	Smoker
46	Male	African American	13	Smoker
49	Male	African American	10	Smoker
55	Female	African American	10	Smoker
52	Female	African American	18	Smoker
45	Female	African American	20	Smoker
47	Male	African American	17	Smoker
29	Male	African American	n/a	Non-smoker
54	Female	Caucasian	n/a	Non-smoker
40	Female	African American	n/a	Non-smoker
48	Male	Caucasian	n/a	Non-smoker
24	Female	Asian	n/a	Non-smoker
35	Female	Asian	n/a	Non-smoker
24	Female	African American	n/a	Non-smoker
35	Female	Caucasian	n/a	Non-smoker
45	Male	Caucasian	n/a	Non-smoker
26	Female	Caucasian	n/a	Non-smoker



Supplementary Figure 1. The scatter plot of the estimated measurement noise in variance versus the mean intensities of peaks over S1 to S8.

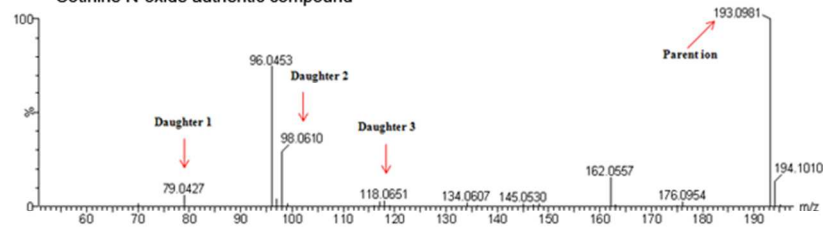


Supplementary Figure 2. Evaluation of the variation due to sample preparation. Scatter plot of the logarithmic intensity of the 1st and 2nd aliquots of S1 to S8. The peak intensities of each aliquot are the average of the repeated injections from the aliquot.

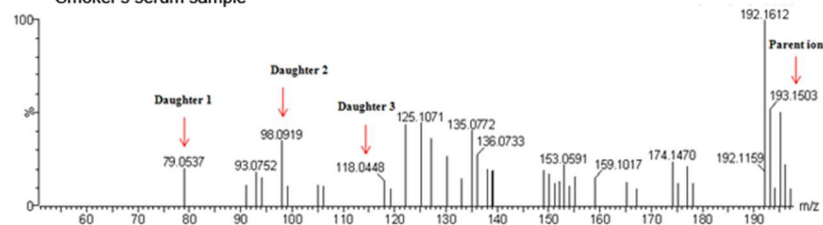


Supplementary Figure 3. Evaluation of the effects of running time and carry-overs. Scatter plots of logarithmic intensities of the four aliquots of S1 and S2 versus the four aliquots of S1' and S2'. The intensity of each aliquot is the average intensity of the repeated injections of that aliquot.

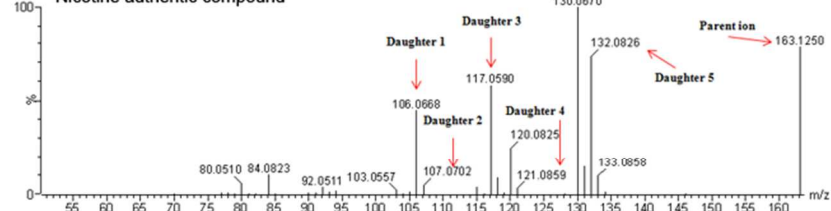
e1) MS/MS of 193.23 (+)
Cotinine N-oxide authentic compound



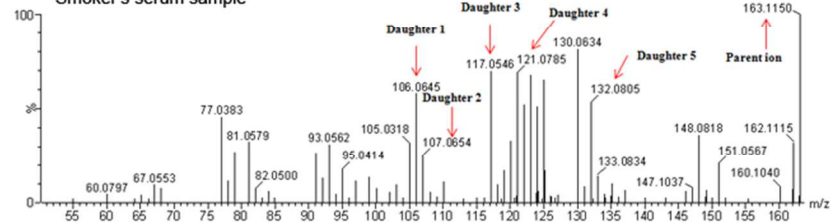
e2) MS/MS of 193.23 (+)
Smoker's serum sample



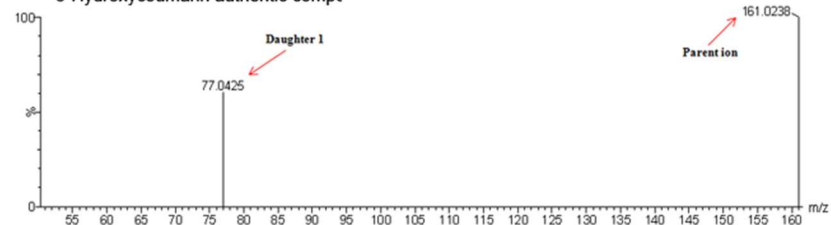
f1) MS/MS of 163.12 (+)
Nicotine authentic compound



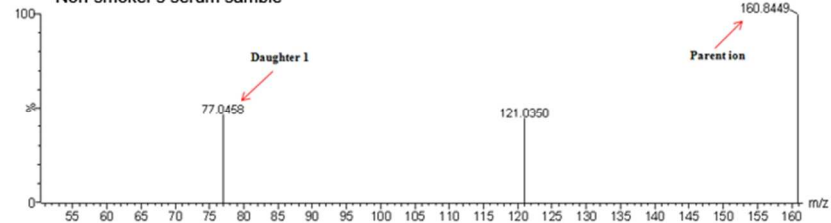
f2) MS/MS of 163.12 (+)
Smoker's serum sample



g1) MS/MS of 161.02 (-)
3-Hydroxycoumarin authentic comp



g2) MS/MS of 161.02 (-)
Non-smoker's serum sample



Supplementary Figure 4. MS/MS spectrum from authentic compounds of cotinine N-oxide (e1), nicotine (f1), and 3-hydroxycoumarin (g1). MS/Ms spectrum obtained from serum samples of smoker (e2, f2) or non-smoker (g2) were also presented for comparison.